Greek commerce and for the interchange of Greek thought, and a brilliant period followed—one of the most memorable in the history of the world." Athens became the centre of all intellectual movement. To her—the Athens of Pericles—came Hippocrates of Chios, and "in this city geometry was first published."

Our author agrees with Hankel (against Proclus) as to the important influence of the Eleatics (Parmenides and Zeno), "not only on the development of geometry at that time (circ. 450 B.C.), but further on its subsequent progress in respect of *method*." Clairaut, in his "Elements of Geometry" (recently translated by Dr. Kaines, the original text is cited by Dr. Allman), notices this influence in the case of Euclid. The paradoxes of Zeno led to the banishment of the Infinite (which plays so important a part in the modern treatment), "the infinitely small as well as the infinitely great." What Hippocrates may very fairly be supposed to have done in relation to the squaring of the circle is, we think, well put. "Simplicius has preserved in his 'Comm. to Phys. Ausc.' of Aristotle a pretty full and partly literal extract from the 'History of Geometry' of Eudemus." It is to Bretschneider we owe a careful revision and emendation of this fragment, and our author has skilfully attempted to determine what is Simplicius and what is simply Eudemus in this account. It is curious that Bretschneider merely notices the "circumstantiality of the construction and the long-windedness and the over-elaboration of the proofs," and Hankel expresses surprise that this fragment, "150 years older than Euclid's Elements, already bears that character, typically fixed by the latter, which is so peculiar to the geometry of the Greeks." Had the present pamphlet been confined to the elucidation of this single matter it would have had a sufficient *raison d'être*.

The next geometer whose contributions to geometry are determined and discussed is Democritus, more usually regarded as a philosopher. At this stage, too, our author takes stock, and shows that the progress made in this (about) half-century interval since Pythagoras mainly "concerns the circle."

We note the connection of the name of Hippocrates with another of the famous problems of antiquity, viz. the duplication of the cube: he seems to have been the first to reduce this question to the finding of two mean proportionals between two given straight lines, the greater of which is double the less. Many interesting particulars are given in connection with this problem. The general problem is stated to have been first solved by "Archytas of Tarentum, then by his pupil Eudoxus of Cnidus, and thirdly by Menæchmus, a pupil of Eudoxus"; this last used "the conic sections which he had discovered." A third problem, the tri-section of an angle, also came to the front about this time. Dr. Allman fully discusses this also, and shows that it was one which was fairly within the reach of a Pythagorean. Montucla however attributes to Hippias of Elis, a contemporary of Socrates, the invention of the quadratrix (the quadratrix of Dinostratus), by means of which (in a quite different way from Sylvester's Fan) an angle can be not only trisected, but divided into any number of equal parts. Allman sides with Hankel and shows the improbability of Hippias being the inventor, but he is against him when he refers the method of exhaustions to Hippocrates of Chios. It will have been seen that the great geometer of this period is Hippocrates, "who seems to have attracted notice as well by the strangeness of his career as by his striking discovery of the quadrature of the lune." The unfavourable statements of Aristotle, Eudemus, Jamblichus, and Eutocius are examined, and part of the summing up is, "We may fairly assume that Hippocrates imperfectly understood some of the matter to which he had listened; and that, later, when he published what he had learned, he did not faithfully render what had been communicated to him."

An examination of this pamphlet still further shows that the writer, while carefully using the recent works of Bretschneider, Hankel, Cantor, and others, has himself gone over the original authorities and formed his own opinions upon the difficult questions that turn up. It is, in our opinion, a most valuable contribution to the subject, and we shall be glad when the piecemeal work in "Hermathena" is done, and the book appears, as we believe it is the writer's intention that it should appear, in proper book form as one work.

OUR BOOK SHELF

The Zoological Record for 1879. Being Volume Sixteen of the Record of Zoological Literature. Edited by Edward Caldwell Rye, F.Z.S. (London: John Van Voorst, for the Zoological Record Association, 1881.)

THE editor's promise to the members of the Zoological Record Association has been kept, and the *Record* for 1879 was published in the month of April in this year. We gladly note in addition his confident expectation that the *Record* for 1880 will be published ere the present year ends. This sixteenth volume contains nearly 700 pages of well-condensed records of the literature of zoology of 1879. The lion's share of the hard work has fallen to Mr. W. F. Kirby, who, with Mr. McLachlan, records the literature of the Insecta. The Rev. O. P. Cambridge gives the record of the Arachnida for 1878 and 1879. The Vermes and Echinoderms are done by Prof. Jeffrey Bell, and the Cœlenterata and Protozoa are elaborated by A. G. Bourne, S. J. Hickson, and Stuart Ridley. The works on the Mammals are recorded by W. A. Forbes; on the Birds by Howard Saunders; on the Reptiles and Fishes—alas! that we should have to write it—by the late gifted A. W. E. O'Shaughnessy. Prof. E. von Martens still records the literature of the Mollusca and Molluscoidea, the only recorder still remaining as such of that small group who came to the assistance of Dr. Günther in 1864. We miss from last year's list of recorders Dr. C. Lütken, who served during his seven years well and faithfully; in him knowledge and experience of the subject he worked at were combined with much tact. The British Association, the Royal Society, and the Zoological Society of London have, as is now usual, handsomely assisted in aid of the publication of this most useful volume.

The most useful index to new genera and sub-genera seems most carefully done. The list of new genera is for the year almost 1000; so that evidently the zoological kingdom is not as yet worked out.

Wiltshire Rainfall, 1880. (Marlborough: C. Perkins and Son, *Times* Office).

THE compilers of this carefully-printed and, for the class of publications, luxuriously got-up annual merit our hearty commendation for the general excellence of the work thus put before us. From its physical geography Wiltshire forms a well-marked rainfall region, it being a little to the north of the centre of the county that the two Avons and several tributaries of the Thames take their rise. From this plateau the country slopes northward to the

Upper Thames, eastwards along the Kennet, southwards to Salisbury, and westwards along the North Avon. The rainfall of this region is now observed at twenty-eight stations, and the daily amounts are printed *in extenso*, and the eye readily notes the maximum monthly fall at each station, these being printed in thicker type. On each monthly sheet the means of the previous ten years' observations are given for the ten stations at which observations have been made for the whole of that period. The mean annual rainfall of these stations for the past eleven years is 32·14 inches, the monthly maximum being 3·49 inches in October, and the minimum 1·82 inches in March. As contrasted with the more strictly central districts of England, the summer rainfall is relatively less, and the autumnal and winter rainfalls greater; and as contrasted with places more open to the Atlantic to west and south-westward, the rainfall is relatively greater in summer and less in winter. At seventeen stations observations have been made for at least six years, at which, if the averages be struck for the eleven years, differentiating where necessary, the largest mean rainfall is seen to be 40·32 inches at Corsham, near the summit of the long ridge separating the North Avon from its tributary Box Brook, and the smallest 29·76 inches at Pen Hill in the north on the high ground between the Thames and its tributary the Cole; —the former being one of the heights most open to winds from the Atlantic, and the latter one of the most sheltered heights from these winds. As regards annual amount and variation with season and configuration of surface, the rainfall of Wiltshire curiously resembles that of Deeside, Aberdeenshire. An excellent map showing the stations and their heights and the physical features of the county accompanies the Report.

Pheasants: their Natural History and Practical Management. By W. B. Tegetmeier, F.Z.S. Second Edition, greatly enlarged. (London: *The Field* Office, 1881.)

MR. TEGETMEIER is so well known as an authority upon pigeons and poultry of all kinds that everything which he writes on the subject of these birds is sure to be received with attention, and it is therefore scarcely a matter of surprise that a second edition of his well-known "Pheasant" book should have been called for. The work will be found invaluable to any one projecting the cultivation of pheasants either in the covert or in the aviary. After a brief review of the habits of pheasants in a wild state, the author gives ample information as to their management in preserves and in confinement, and also discusses the much-vexed question of the gapes and other diseases to which these birds are subject. The second portion of the work is devoted to the natural history of the common pheasant and its allies which are suitable for introduction into our woods, and also treats of the more gaudily-coloured Golden Pheasant, Monâl, and other species adapted for the aviary. Valuable experiences of the rearing of these birds and their habits in confinement are given by Mr. Tegetmeier, who seems to have spared no pains to make his book interesting and instructive. The illustrations have been executed on wood by the well-known artist Mr. T. W. Wood, who has evidently studied the birds in a state of nature; and although the plumage of the pheasant family does not lend itself readily to this style of illustration, the attitudes of most of the birds are happily rendered, while some of the figures representing the "showing off" of the male birds are excellently conceived.

Nach Ecuador. Reisebilder. Von Joseph Kolberg, S.J. Zweite vermehrte Auflage, mit einem Titelbild, 140 Holzschnitten und einer Karte von Ecuador. (Freiburg-im-Breisgau: 1881.)

THE Archbishop of Quito proceeded to Rome in 1869 to attend the meeting of the Vatican Council, and he bore with him a commission from Don Garcia Moreno, President of Ecuador, to obtain powers to establish a Polytechnic School and College for the Republic. As a result he sent to Quito, in 1870, two Germans and one Italian, members of the Society of Jesus, who should lay the foundation-stone of the establishment, and in 1871 Joseph Kolberg, the author of this quarto volume, followed. The murder of President Moreno in August, 1875, gave a death-blow to the new institution. During the five years of his sojourn in the country Kolberg had been in the habit of sending home notes of his various tours, sketches of the manners and customs of the people he met with, and this in a somewhat methodic manner, as might be expected from a professor of the higher mathematics. These notes and sketches were published from time to time in a publication called *Stimmen aus Maria-Loch*, and they embraced among others an account of the voyage out, of a visit to Chimborazo, and an account of the catastrophe of Havra (1868), and incidental to these latter chapters the author introduces a theory of volcanic eruptions which he evidently thinks the best fruit of his visit to Quito. All these varied sketches and others on the natural history and geography of the country were, at the "request of friends," re-published in one handsome illustrated quarto volume, which was indeed to have been dedicated to President Moreno, but is now dedicated to his memory. The first edition was edited by the author's friend, R. Cornelly, S.J., and was published in 1876. The present edition, which has been corrected and enlarged throughout, has been published under the author's own superintendence. Some of the wood engravings are new and interesting; others, such as those representing the flying-fish and the Coral Island, have well served their generation.

Second Report of the United States Entomological Commission for the Years 1878 *and* 1879. With Maps and Illustrations. 8vo, pp. 322, and Eight Appendices, pp. 74. (Washington: Government Printing Office, 1880.)

THIS Report of the three Commissioners (Prof. Riley, Dr. Packard, and Dr. Thomas) appointed to investigate the ravages of the "Rocky Mountain" and other locusts forms a handsome volume, got up in the exhaustive and elaborate manner so marked in all the U.S. Government publications. It is exceedingly difficult to give an adequate notice in a short space, on account of the varied nature of the subjects touched upon. Our readers will gather from this remark that "Economic Entomology" in the proper sense of the term by no means occupies the entire volume, nor is it entirely confined to the "Rocky Mountain" pest in particular. A large portion is occupied by an elaborate investigation of the habits of migratory locusts in all parts of the world, gathered from a host of publications, some of them of ancient date. The connection of meteorological influences with the migrations and development of North American locusts is fully examined. Chapters IX. to XI. treat on the anatomy of the locust, and form valuable contributions to the anatomy of insects in general, such as one would scarcely expect to find in a report of this nature; of these Chapters IX. and XI. are by Dr. Packard, and treat of the air-sacs and brain respectively; X. is by Mr. Minot, on general histology: these are illustrated by excellent plates. The "economic" chapters are more especially by Messrs. Riley and Thomas, and go exhaustively into the question, more especially as to attacking the insect in its breeding-places, experience proving that war waged against the migratory swarms is comparatively useless; in connection with this, suggestions of a very broad nature are made. The Government is advised to encourage settlement of waste lands and the making of railroads conducing thereto, to induce broad schemes for irrigation, to guard the present timber, and encourage the planting of forests, to effect judicious burning in the breeding-grounds, covering about 400,000